National 5 Biology

Unit 1

Cell Biology

Ink Exercise Seven

Photosynthesis

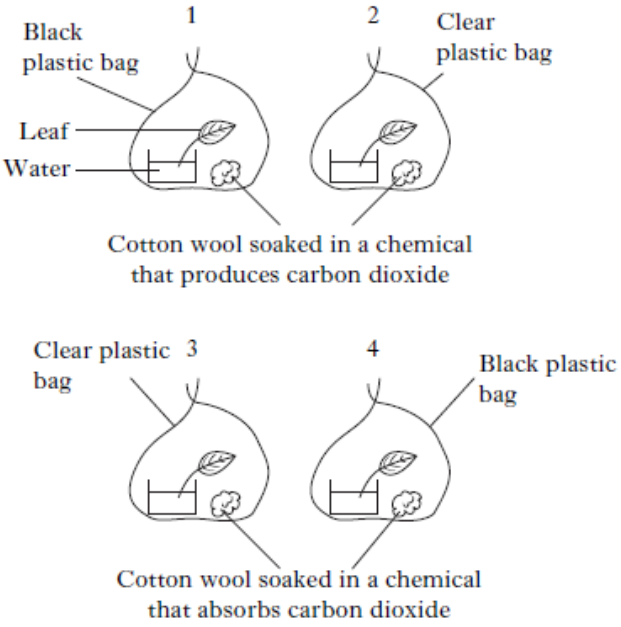
Name: _____

Class: _____

1. The role of chlorophyll in photosynthesis is to trap
   a. light energy for ATP production
   b. chemical energy for ATP production
   c. light energy for ADP production
   d. chemical energy for ADP production

2. The raw materials for photosynthesis are
   a. carbon dioxide and water
   b. oxygen and water
   c. carbon dioxide and glucose
   d. oxygen and glucose

3. The diagram below show four experiments used to investigate the conditions needed for photosynthesis.

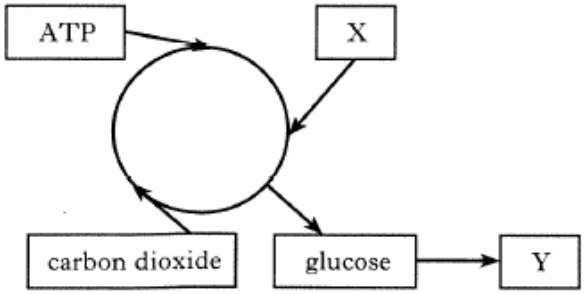


   After 2 days, the four leaves were tested for the presence of starch.
   The results from the two experiments should be compared to show that carbon dioxide is needed for photosynthesis?
   a. 1 and 2
   b. 2 and 4
   c. 2 and 3
   d. 3 and 4

4. The products of the photolysis stage of photosynthesis are
   a. Glucose and hydrogen
   b. Oxygen and water
   c. Carbon dioxide and water
   d. Oxygen and hydrogen

5. ATP synthesised during photolysis provides the carbon fixation stage of photosynthesis with
   a. Glucose
   b. Carbon dioxide
   c. Energy
   d. Hydrogen

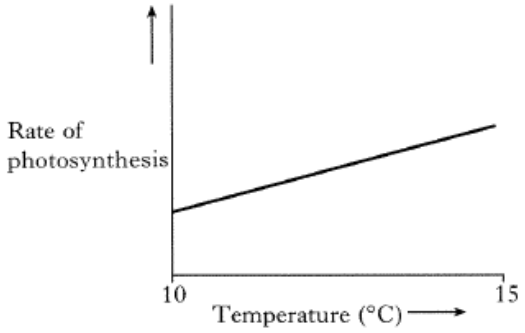
6. The diagram below shows the carbon fixation stage of photosynthesis.



Which line in the table correctly identifies X and Y?

	X	Y
A	Hydrogen	Starch
B	Starch	ADP
C	Starch	Oxygen
D	Water	Starch

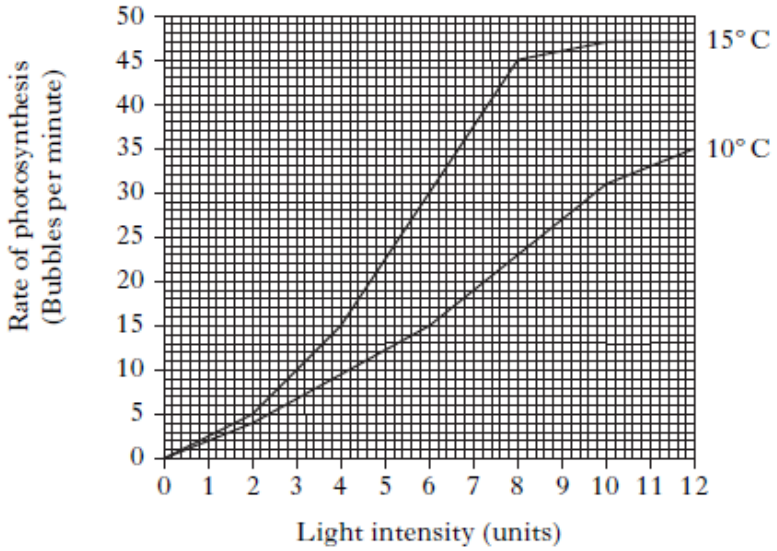
7. The graph below shows the effect of temperature on the rate of photosynthesis in a plant.



A correct conclusion would be that
   a. As the temperature increases, the rate of photosynthesis increases
   b. As the temperature increases, the rate of photosynthesis decreases
   c. As the temperature increases, the rate of photosynthesis remains constant
   d. As the temperature decreases, the rate of photosynthesis increases

8. Which of the following are all limiting factors in photosynthesis?
   a. Carbon dioxide concentration, temperature and light intensity
   b. Carbon dioxide concentration, oxygen concentration and light intensity
   c. Oxygen concentration, temperature and light intensity
   d. Oxygen concentration, carbon dioxide concentration and temperature

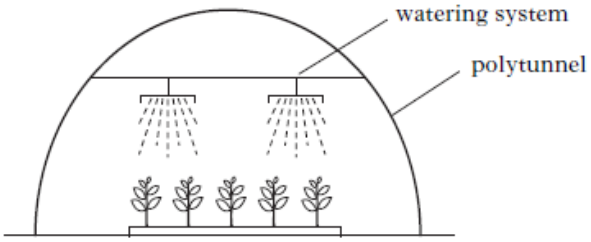
9. The graph below shows the rate of photosynthesis, as light intensity increases, at two different temperatures.



At light intensity of 6 units, what is the simplest whole number ratio of the rate of photosynthesis at $10^{o}C$ compared to $15^{o}C$?

a. 15 : 30
b. 10 : 15
c. 3 : 6
d. 1 : 2

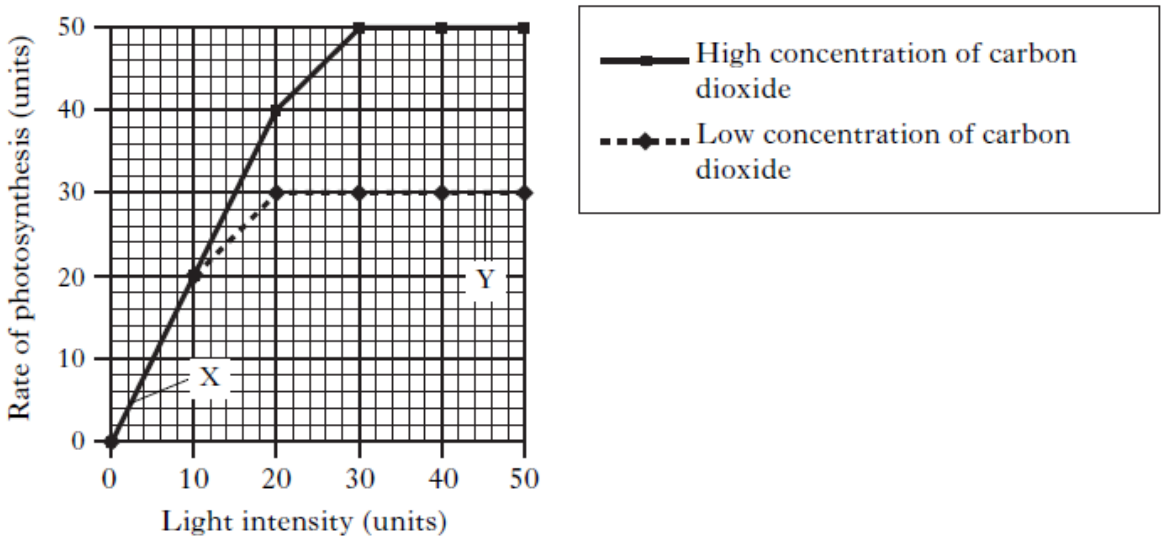
10. A crop of tomatoes was grown in a polytunnel.



Which of the following changes would not produce an earlier crop of tomatoes?

a. Increasing the heat during the day
b. Increasing the CO_2 concentration at night
c. Increasing the light intensity at night
d. Increasing the CO_2 concentration during the day and night

11. The graph below shows the effects of two different environmental factors on the rate of photosynthesis.



a. What are the limiting factors at points X and Y?

X _____ Y _____ 2

b. Suggest **one** way that the rate of photosynthesis can be measured.

_____ 1

c. Explain why an increase in temperature can lead to an increase in the rate of photosynthesis.

_____

_____ 1

d. During the first stage of photosynthesis, light energy is used

i. Where is light energy trapped in the cell?

_____ 1

ii. State **one** use of this light energy

_____ 1

e. Photosynthesis occurs in two stages

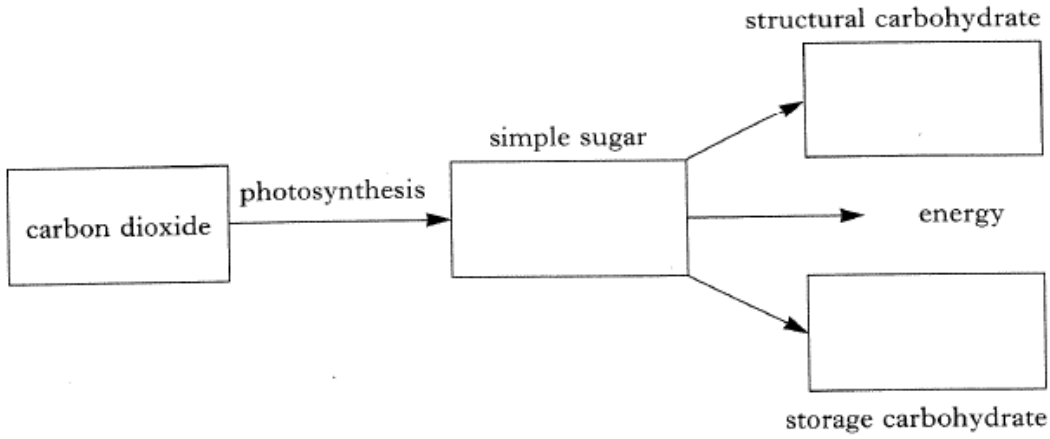
i. Name the second stage of photosynthesis

_____ 1

ii. Give the role of hydrogen in the second stage of photosynthesis

_____ 1

f. The diagram below shows the fate of the carbon dioxide used in photosynthesis. Complete the diagram by naming each of the carbohydrates described.



3

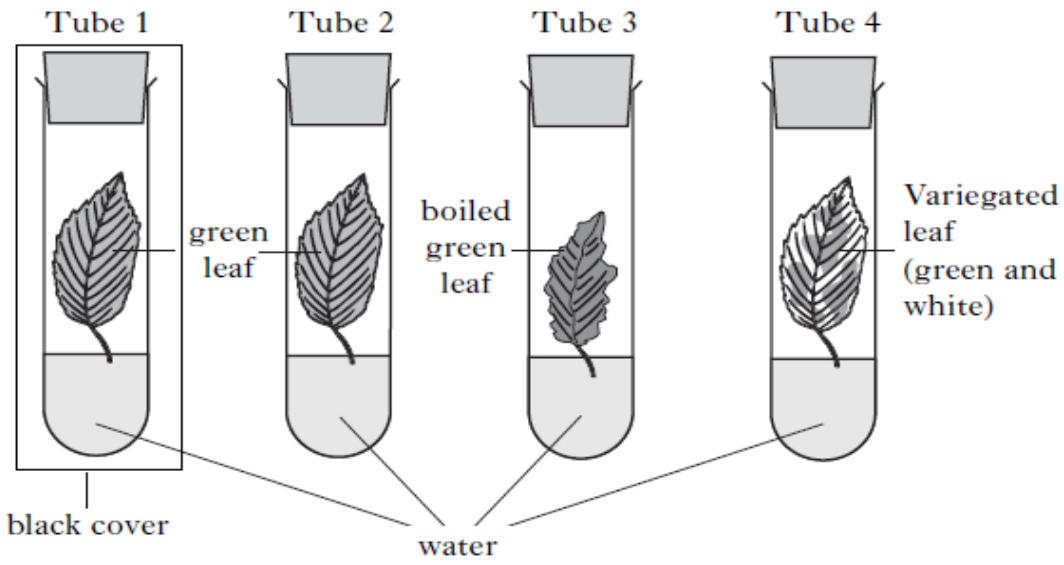
12. The rate of photosynthesis can be limited by different factors

Draw one line from each set of conditions to the factor that would be limiting photosynthesis

Set of conditions	*Factor limiting photosynthesis*
High on a mountain on a sunny winter day	Light intensity
The middle of a corn field on a warm bright day with no wind	Wind speed
Late evening of a warm breezy summer day in a forestry plantation	Carbon dioxide availability
	Temperature

2

13. Leaves were placed in tubes as shown below. The tubes were left in bright light.



For each of the tubes, tick (√) the appropriate box in the table to indicate which processes will take place in the leaves.

Process / Tube	*Only photosynthesis*	*Only respiration*	*Both*	*Neither*
1				
2				
3				
4				

2

/25

Areas I need to work on: